(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the in vivo region to provide a conspicuity of the nerve that is at least 1.1 times that of [the] any adjacent non-neural tissue, without the use of neural contrast agents.

Please add the following new Claim 164:

--164. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

(a) exposing an in vivo region of a subject to a magnetic polarizing field, the in vivo region including non-neural tissue and a nerve, the nerve being a member of the group consisting of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves;

(b) exposing the in vivo region to an electromagnetic excitation field;

(c) sensing a resonant response of the in vivo region to the polarizing and excitation fields and producing an output indicative of the resonant response;

(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the in vivo region of the subject, said step of ~~enhancing~~ controlling the performance of steps (a), (b), and (c) including ~~selection of~~ selecting a combination of echo time and repetition time that exploits a characteristic spin-spin relaxation coefficient of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves, wherein said spin-spin relaxation coefficient ~~that~~ is substantially longer than that of other surrounding tissue; and

(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the in vivo region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents.--

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Please amend Claim 104, at line 1, by deleting "Claim 103" and inserting therefor --Claim 164--.

Please cancel Claims 139-149.

Add the following new Claim 165:

--165. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

(a) exposing an in vivo region of a subject to a magnetic polarizing field, the in vivo region including non-neural tissue and a nerve, the nerve being a member of the group consisting of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves, said magnetic polarizing field including a first diffusion-weighted gradient that is substantially parallel to the nerve and a second diffusion-weighted gradient that is substantially perpendicular to the nerve;

(b) exposing the in vivo region to an electromagnetic excitation field;

(c) sensing a resonant response of the in vivo region to the polarizing and excitation fields and producing a first output indicative of the resonant response to said first diffusion-weighted gradient and a second output indicative of the response to said second diffusion-weighted gradient;

(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the in vivo region of the subject; and

(e) subtracting said first output from said second output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the in vivo region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents.--

Please amend Claim 93 at line 1 by deleting "Claim 92" and inserting therefor --Claim 165--.

Please amend Claim 95 at line 1 by deleting "Claim 92" and inserting therefor --Claim 165--.

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Please add the following new Claims 166 and 167:

--166. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

(a) exposing an in vivo region of a subject to a magnetic polarizing field that includes a predetermined arrangement of gradients, the in vivo region including non-neural tissue and a nerve, the nerve being a member of the group consisting of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves;

(b) exposing the in vivo region to an electromagnetic excitation field;

(c) sensing a resonant response of the in vivo region to the polarizing and excitation fields and producing an output indicative of the resonant response, said producing an output indicative of the resonant response including the step of producing a separate output for each diffusion-weighted gradient of said predetermined arrangement of gradients;

(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the in vivo region of the subject;

(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the in vivo region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents, said processing the output including the step of vector processing the separate outputs for each said diffusion-weighted gradient of said predetermined arrangement of gradients to generate data representative of anisotropic diffusion exhibited by the nerve, and processing said data representative of said anisotropic diffusion to generate said data set describing the shape and position of the nerve.

167. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

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(a) exposing an in vivo region of a subject to a magnetic polarizing field, the in vivo region including non-neural tissue that includes fat and a nerve, the nerve being a member of the group consisting of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves;

(b) exposing the in vivo region to an electromagnetic excitation field;

(c) sensing a resonant response of the in vivo region to the polarizing and excitation fields and producing an output indicative of the resonant response;

(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the in vivo region of the subject; and

(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the in vivo region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents; and

said steps of exposing the in vivo region to an excitation field and producing an output being designed to suppress the contribution of fat in the output, said step of processing the output to generate the data set including the step of analyzing the output for information representative of fascicles found in peripheral nerves, cranial nerves numbers three through twelve and autonomic nerves.--

Amend Claim 98, at line 1, by deleting "Claim 97" and inserting therefor --Claim 167.--

Please amend Claim 100 , at line 1, by deleting "Claim 99" and inserting therefor --Claim 167--

Please add the following new Claim 168:

--168. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

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